

TENT COOPERATION TREA

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

RICKS, Michael, James
Syngenta Limited
Intellectual Property Dept.
Jealott's Hill Research Station
P.O. Box 3538
Bracknell RG42 6YA
ROYAUME-UNI

| | |
|---|--|
| Date of mailing (day/month/year) 04 July 2001 (04.07.01) | |
| Applicant's or agent's file reference PPD 50341/WO | IMPORTANT NOTIFICATION |
| International application No. PCT/GB00/00249 | International filing date (day/month/year) 28 January 2000 (28.01.00) |

| | | |
|---|---|---|
| 1. The following indications appeared on record concerning: | | |
| <input checked="" type="checkbox"/> the applicant | <input type="checkbox"/> the inventor | <input type="checkbox"/> the agent <input type="checkbox"/> the common representative |
| Name and Address SYNGENTA LIMITED Fernhurst Haslemere Surrey GU27 3JE United Kingdom | State of Nationality GB | State of Residence GB |
| | Telephone No. | |
| | Facsimile No. | |
| | Teleprinter No. | |
| 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning: | | |
| <input type="checkbox"/> the person | <input type="checkbox"/> the name | <input checked="" type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence |
| Name and Address SYNGENTA LIMITED Fernhurst Haslemere Surrey GU27 3JE United Kingdom | State of Nationality GB | State of Residence GB |
| | Telephone No. | |
| | Facsimile No. | |
| | Teleprinter No. | |
| 3. Further observations, if necessary: | | |
| 4. A copy of this notification has been sent to: | | |
| <input checked="" type="checkbox"/> the receiving Office | <input type="checkbox"/> the designated Offices concerned | |
| <input type="checkbox"/> the International Searching Authority | <input checked="" type="checkbox"/> the elected Offices concerned | |
| <input checked="" type="checkbox"/> the International Preliminary Examining Authority | <input type="checkbox"/> other: | |

| | |
|---|--|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer R. Chrem Telephone No.: (41-22) 338.83.38 |
|---|--|

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C.20231
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

| | |
|---|--|
| Date of mailing (day/month/year) 04 October 2000 (04.10.00) | |
| International application No. PCT/GB00/00249 | Applicant's or agent's file reference PPD 50341/WO |
| International filing date (day/month/year) 28 January 2000 (28.01.00) | Priority date (day/month/year) 22 February 1999 (22.02.99) |
| Applicant BEAN, Michael, John et al | |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

21 July 2000 (21.07.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

| | |
|---|---|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer Pascal Piriou Telephone No.: (41-22) 338.83.38 |
|---|---|

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

RICKS, Michael, James
Syngenta Limited
Intellectual Property Dept.
Jealott's Hill Research Station
P.O. Box 3538
Bracknell RG42 6YA
ROYAUME-UNI

| | |
|--|--|
| Date of mailing (day/month/year) 25 April 2001 (25.04.01) | IMPORTANT NOTIFICATION |
| Applicant's or agent's file reference PPD 50341/WO | |
| International application No. PCT/GB00/00249 | International filing date (day/month/year) 28 January 2000 (28.01.00) |

1. The following indications appeared on record concerning:
- ☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

| | | |
|--|----------------------------|--------------------------|
| Name and Address ZENECA LIMITED 15 Stanhope Gate London W1Y 6LN United Kingdom | State of Nationality GB | State of Residence GB |
| | Telephone No. | |
| | Facsimile No. | |
| | Teleprinter No. | |

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:
- ☐ the person ☒ the name ☒ the address ☐ the nationality ☐ the residence

| | | |
|---|----------------------------|--------------------------|
| Name and Address SYNGENTA LIMITED Fernhurst Haselmere Surrey GU27 3JE United Kingdom | State of Nationality GB | State of Residence GB |
| | Telephone No. | |
| | Facsimile No. | |
| | Teleprinter No. | |

3. Further observations, if necessary:
This is only a change of name and address, and no transfer of patent or other rights has occurred. Agent's address has also been changed accordingly.

4. A copy of this notification has been sent to:

| | |
|---|---|
| <input checked="" type="checkbox"/> the receiving Office | <input type="checkbox"/> the designated Offices concerned |
| <input type="checkbox"/> the International Searching Authority | <input checked="" type="checkbox"/> the elected Offices concerned |
| <input checked="" type="checkbox"/> the International Preliminary Examining Authority | <input type="checkbox"/> other: |

| | |
|---|----------------------------------|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland | Authorized officer R. Chrem |
| Facsimile No.: (41-22) 740.14.35 | Telephone No.: (41-22) 338.83.38 |

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|--|--|--|
| Applicant's or agent's file reference PPD 50341/WO | FOR FURTHER ACTION <small>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</small> | |
| International application No. PCT/GB 00/ 00249 | International filing date (day/month/year) 28/01/2000 | (Earliest) Priority Date (day/month/year) 22/02/1999 |
| Applicant ZENECA LIMITED et al. | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.
☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant.
- ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

- ☐ as suggested by the applicant.
- ☐ because the applicant failed to suggest a figure.
- ☐ because this figure better characterizes the invention.
- ☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/00249

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A01N57/20 A01N43/40 A01N25/30 A01N25/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US retrieved from STN-INTERNATIONAL, accession no. 124:79455 CA XP002137058 abstract see IT & JP 07 242510 A (NIHON HOHYAKU) 19 September 1995 (1995-09-19) --- | 1-7, 11, 15 |
| X | WO 91 00010 A (FINCH CHARLES W JR) 10 January 1991 (1991-01-10) page 3, paragraph 2 page 4, paragraph 2 -page 5, paragraph 1 page 5, line 15 --- -/-- | 1-8, 11-13, 15 |

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

8 May 2000

Date of mailing of the international search report

06/07/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Lamers, W

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/00249

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| P,X | WO 99 48359 A (MULQUEEN PATRICK JOSEPH ;BANKS GRAHAM (GB); DIXON KEITH RODERICK () 30 September 1999 (1999-09-30) page 9, line 15 page 10, line 16 - line 24 claim 1 page 11, line 17 - line 20 --- | 1,5-7 |
| A | WO 93 22917 A (HENKEL CORP) 25 November 1993 (1993-11-25) page 2, line 15 - line 20 page 12, line 22 - line 24 --- | 1-16 |
| A | WO 96 00010 A (ZENECA LTD ;TOWNSON JANE KAREN (GB); HART CLIFFORD ARTHUR (GB); OS) 4 January 1996 (1996-01-04) page 2, paragraph 3 page 7, paragraph 6 page 8, paragraph 2 page 10, paragraph 4 page 11, paragraph 3 --- | 1-16 |
| A | WO 94 12259 A (HOORNE DIRK ;AUDA MAHROUSSA (BE); ICI PLC (GB)) 9 June 1994 (1994-06-09) page 1, line 34 -page 2, line 25 page 5, line 20 - line 21 page 8, line 9 - line 16 page 13, line 4 - line 30 --- | 1-16 |
| A | EP 0 388 239 A (ALBRIGHT & WILSON) 19 September 1990 (1990-09-19) page 2, line 42 - line 52 page 4, line 15 page 4, line 56 - line 57 --- | 1-16 |
| A | EP 0 487 262 A (UNILEVER PLC ;UNILEVER NV (NL)) 27 May 1992 (1992-05-27) page 2, line 39 - line 56 page 3, line 2 - line 3 page 6, line 5 - line 20 ----- | 1-16 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/00249

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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| | WO 9412259 A | 09-06-1994 | US 5750513 A 12-05-1998 |
| | | | AT 176600 T 15-02-1999 |
| | | | AU 676518 B 13-03-1997 |
| | | | AU 5469294 A 22-06-1994 |
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| | | | DE 69323498 D 25-03-1999 |
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| | | | AU 634524 B 25-02-1993 |
| | | | AU 5143890 A 20-09-1990 |
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| | | | CN 1045682 A 03-10-1990 |
| | | | CZ 9001255 A 11-08-1999 |
| | | | DD 292830 A 14-08-1991 |
| | | | DE 69015849 D 23-02-1995 |
| | | | DE 69015849 T 01-06-1995 |
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| | | | EG 19351 A 30-12-1994 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/00249

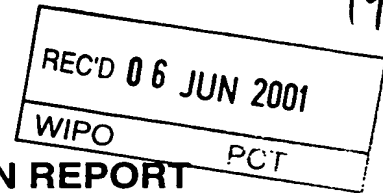
| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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| | | JP 2289502 A | 29-11-1990 |
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| | | PL 164674 B | 30-09-1994 |
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| | | RO 110289 A | 29-12-1995 |
| | | SK 125590 A | 12-07-1999 |
| | | TR 25699 A | 01-09-1993 |
| | | ZA 9001960 A | 28-12-1990 |
| EP 0487262 A | 27-05-1992 | AU 643849 B | 25-11-1993 |
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| | | DE 69127955 T | 12-02-1998 |
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| | | JP 4292697 A | 16-10-1992 |
| | | KR 9510007 B | 04-09-1995 |
| | | ZA 9109183 A | 21-05-1993 |

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



| | | |
|---|---|--|
| Applicant's or agent's file reference PPD 50341/WO | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/GB00/00249 | International filing date (day/month/year) 28/01/2000 | Priority date (day/month/year) 22/02/1999 |
| International Patent Classification (IPC) or national classification and IPC A01N57/20 | | |
| Applicant SYNGENTA LIMITED et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 9 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

| | |
|---|--|
| Date of submission of the demand 21/07/2000 | Date of completion of this report 01.08.01 |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized officer McDonald, C Telephone No. +49 89 2399 2905  |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00249

I. Basis of this report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-15 as originally filed

Claims, No.:

1-15 as received on 08/03/2001 with letter of 06/03/2001

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00249

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|------|--------|------------------|
| Novelty (N) | Yes: | Claims | 3, 9 |
| | No: | Claims | 1, 2, 4-8, 10-15 |
| Inventive step (IS) | Yes: | Claims | 9 |
| | No: | Claims | 3 |
| Industrial applicability (IA) | Yes: | Claims | 1-15 |
| | No: | Claims | |

2. Citations and explanations see separate sheet

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/00249

Re Item I

Basis of the report

An amendment filed with the letter dated 06.03.2001 introduces subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendment concerned is the following: in the originally filed Claim 3 (p. 16 lines 20-21), the embodiments of the alcohol or ester or alkyl phenol alkoxylate are defined as "each containing from 1-3 C_2 - C_4 alkoxy groups", support for which exists on p. 3 lines 15-16 of the originally filed description. The new Claims 1 and 15, which have been amended to include the definition of the alcohol or ester or alkyl phenol alkoxylate, now read "each containing from **1-3 alkoxy groups**". The scope of these claims is now broader than the application as originally filed. This report is therefore made as if this amendment had not been made.

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1: WO 96 00010 A (ZENECA LTD; TOWNSON JANE KAREN (GB); HART CLIFFORD ARTHUR (GB); OS) 4 January 1996 (1996-01-04)
- D2: WO 91 00010 A (FINCH CHARLES W JR) 10 January 1991 (1991-01-10)
- D3: DATABASE CHEMABS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US retrieved from STN-INTERNATIONAL, accession no. 124:79455 CA XP002137058 & JP 07 242510 A (NIHON HOHYAKU) 19 September 1995 (1995-09-19)
- D4: WO 93 22917 A (HENKEL CORP) 25 November 1993 (1993-11-25)
- D5: WO 94 12259 A (HOORNE DIRK; AUDA MAHROUSSA (BE); ICI PLC (GB)) 9 June 1994 (1994-06-09)
- D6: EP-A-0 388 239 (ALBRIGHT & WILSON) 19 September 1990 (1990-09-19)
- D7: EP-A-0 487 262 (UNILEVER PLC; UNILEVER NV (NL)) 27 May 1992 (1992-05-27)

1) Nov. Ity - Art. 33 (1) and (2) PCT:

Document D1 discloses herbicidal compositions comprising **N-phosphonomethylglycine** or an agriculturally acceptable salt thereof (= glyphosate composition, as defined in the second paragraph of p. 1 of D1), an **alkylpolyglycoside surfactant**, optionally an **additional surfactant** (see e.g. abstract), which can be cationic, **anionic, non-ionic or amphoteric**, such as the **condensation products of ethylene oxide with octyl- or nonyl phenols** (p. 9 lines 11-13), **ethoxylated alcohol** such as those obtained by ethoxylation of a linear or branched chain aliphatic mono-alcohol having a chain length of from 8 to 20 carbon atoms, particularly C₁₃-C₁₅ alcohols; p. 13, Example 1), with a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol, or an amine oxide, quaternary ammonium salts, or ethoxylated long-chain alkyl amines (p. 5 and 6), in combination with other **water-insoluble herbicides** such as diuron, linuron, atrazine, simazine, chlorosulfuron, sulfometron, metsulfuron and chlorimuron (see p. 5 lines 12-36 and p. 11 and 12). The proportion by weight of the alkylpolyglycoside:ethoxylated alcohol is from 1:5 to 8:1 (p. 5, third paragraph), and the proportion by weight of the additional surfactant:ethoxylated alcohol is from 0:1 to 2:1 (p. 6, second paragraph). The proportion by weight of the total of the alkylpolyglycoside, ethoxylated alcohol and additional surfactant to the glyphosate salt is from 3:1 to 1:3 (p. 6, last paragraph), particularly 2:1 (p. 14 lines 9-11). Said herbicidal compositions are used for **severely damaging or killing unwanted plants**, and particularly providing enhanced rainfastness ensuring the compositions are not washed off the plants by rain (p. 1 last paragraph and Claim 14).

Document D2 discloses liquid compositions comprising an **agrochemical electrolyte**, such as bipyridilium herbicides (e.g. paraquat; see p. 1), a further **water-insoluble photosynthesis-inhibiting herbicide** such as diuron and linuron (see the first and last paragraphs on p. 4), a **polyalkyl glucoside**, such as the known commercial product AL-2233 (see p. 6), and an **additional surfactant**, such as the **ionic** surfactant Arquad C-50 (trimethyl coco ammonium chloride) Igepal CO and CA series surfactants (**ethoxylated octyl- and nonyl phenols**) (see p. 7 lines 4-30). Example 3 on p. 11 discloses a composition containing **paraquat** (16.4 weight %), linuron (0.9 weight %), AL2233 (a **polyglycoside**; 18.0 weight %), as well as **two co-surfactants**, **Igepal CO630** (non-ionic surfactant; 10.0 weight %) and **Arquad 2C-75**

(anionic surfactant; 2.4 weight %). In this composition, the weight ratio of the **paraquat:linuron** (agrochemical electrolyte:water-insoluble agrochemical system) is **18.22:1**.

The presence of a 'structured system' is not explicitly disclosed in the said documents, but the compositions of D1 and D2 comprise all of the components of the compositions of the present application as defined in Claim 1, and would therefore by definition also possess the same 'structured system'.

The subject-matter of Claims 1, 2, 4-8 and 10-15 therefore does not fulfil the requirements of Article 33(2) PCT.

Claim 3 is new, as agrochemical concentrate formulations according to Claim 1, wherein the co-surfactant is one of those as defined in the said Claim 3, are not known from the available prior art.

Claims 9 is new, as agrochemical concentrate formulations according to Claim 1, comprising a further **cationic** surfactant in addition to the co-surfactant, are not known from the available prior art.

The subject-matter of Claims 3 and 9 therefore fulfils the requirements of Article 33(2) PCT.

2) Inventive Step - Art. 33 (1) and (3) PCT:

Document D1, which is considered to represent the most relevant state of the art, discloses herbicidal compositions for severely damaging or killing unwanted plants, particularly providing enhanced rainfastness to ensure the compositions are not washed off the plants by rain, said compositions comprising N-phosphonomethylglycine or an agriculturally acceptable salt thereof (= glyphosate composition, as defined in the second paragraph of p. 1 of D1), an alkylpolyglycoside surfactant, optionally an additional surfactant (see e.g. abstract), which can be cationic, anionic, non-ionic or amphoteric, such as the condensation products of ethylene oxide with octyl- or nonyl phenols (p. 9 lines 11-13), ethoxylated alcohol such as those obtained by ethoxylation of a linear or branched chain aliphatic mono-

alcohol having a chain length of from 8 to 20 carbon atoms, particularly C₁₃-C₁₅ alcohols; p. 13, Example 1), with a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol, or an amine oxide, quaternary ammonium salts, or ethoxylated long-chain alkyl amines (p. 5 and 6), in combination with other water-insoluble herbicides such as diuron, linuron, atrazine, simazine, chlorosulfuron, sulfometron, metsulfuron and chlorimuron (see p. 5 lines 12-36 and p. 11 and 12). The proportion by weight of the alkylpolyglycoside:ethoxylated alcohol is from 1:5 to 8:1 (p. 5, third paragraph), and the proportion by weight of the additional surfactant:ethoxylated alcohol is from 0:1 to 2:1 (p. 6, second paragraph). The proportion by weight of the total of the alkylpolyglycoside, ethoxylated alcohol and additional surfactant to the glyphosate salt is from 3:1 to 1:3 (p. 6, last paragraph), particularly 2:1. The subject-matter of Claim 3 differs in that co-surfactant is selected from pentanol, hexanol, octanol octan-2-ol, decanol and their branched chain equivalents, oleyl alcohol, 2-ethyl-1-hexanol, an ethoxylated lauryl alcohol having a mean ethylene content of 2, an ethoxylated octyl phenol having a mean ethylene content of 3, or glyceryl monolaurate.

The problem to be solved by the present invention may therefore be regarded as the provision of alternative agrochemical compositions for the damaging or killing of unwanted plants.

In Claim 3 of D1, it states that the ethoxylated alcohol is obtained by ethoxylation of an aliphatic monoalcohol having a chain length of from 8 to 20 carbon atoms, with a mean degree of ethoxylation of from 2 to 50 moles of ethylene oxide per mole of alcohol. It would therefore be an obvious design option for the man skilled in the art, in order to solve the problem posed, given the information of D1, to ethoxylate an alcohol such as lauryl alcohol (which is a C₁₂ alcohol) with a mean degree of ethoxylation of 2 moles of ethylene oxide, and use this as a co-surfactant in the compositions of D1, thereby arriving at a composition according to Claim 3 of the present application. Claim 3 cannot therefore involve an inventive step. The subject-matter of Claim 3 does not fulfil the requirements of Article 33(3) PCT.

Agrochemical concentrate formulations according to Claim 1, which comprise a further surfactant which is cationic, in addition to the original co-surfactant, as claimed in Claim 9, are neither disclosed nor suggested in the prior art. The subject-

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matter of Claim 9 therefore fulfils the requirements of Article 33(3) PCT.

The documents D3-D7, cited in the international search report, are considered herein as not being relevant for the examination of the present application, as they disclose compositions which do not possess all of the components (a)-(d) as defined in Claim 1.

Re Item VI

Certain documents cited

Reference is made to the following document:

D8: WO 99 48359 A (MULQUEEN PATRICK JOSEPH; BANKS GRAHAM (GB);
DIXON KEITH RODERICK ()) 30 September 1999 (1999-09-30)

No check has been made as to whether the priority of the application is valid. In the case of the priority not being allowable, the document D8 would constitute prior art within the meaning of Rule 64.1(a) to be considered for Articles 33(2) and 33(3) PCT. D8 discloses agrochemical compositions, for use as a pesticide (wherein the term "pesticide" encompasses insecticides, herbicides, fungicides and acaricides; see p. 4 lines 26-30), comprising a glyphosate mixture (p. 9 line 15), insecticides, herbicides, fungicides or acaricides with solubilities in water of not greater than 600 ppm (= water-insoluble; p. 5 line 1-p.9 line 1), alkylpolyglycosides (e.g. p. 2 lines 28-36), particularly alkylglucosides (see e.g. p. Examples 3 and 4 on p. 14 and 15), and anionic or nonionic surfactants (p. 11 lines 17-19).

Re Item VII

Certain defects in the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D2 are not mentioned in the description, nor are these documents identified therein.

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Rule VIII

Certain observations on the international application

- a) The term "CITHROL GML", mentioned in the description on p. 3 line 30, has not been acknowledged as a registered trademark or product name (PCT Guidelines C-II, chapter 4.16).
- b) The description must be brought into conformity with the amended set of claims.

CLAIMS

1. An aqueous agrochemical concentrate formulation comprising
- 5 a) an agrochemical electrolyte
- b) a water-insoluble agrochemical system
- c) an alkylglycoside
- d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system
- 10 wherein the co-surfactant (d) is
- i) a linear or branched chain aliphatic or aromatic alcohol or
- ii) an alcohol or ester or alkyl phenol alkoxylate which is an alkoxylated $C_8 - C_{22}$ alcohol, an alkoxylated $C_8 - C_{22}$ alkyl phenol or an alkoxylated $C_8 - C_{22}$ carboxylic acid each containing from 1-3 alkoxy groups
- 15 or
- iii) a glyceryl alkyl or alkenyl ester.
2. A concentrate according to claim 1 wherein the linear or branched chain alcohol (i) is a primary or secondary, linear or branched alkyl or alkenyl alcohol containing from 5
- 20 to 20 carbon atoms or is a an alkyl-substituted aromatic alcohol containing from 5 to 20 alkyl carbon atoms
- or wherein
- the alcohol or ester or alkyl phenol alkoxylate (ii) is an alkoxylated $C_8 - C_{22}$ alcohol, an alkoxylated $C_8 - C_{22}$ alkyl phenol or an alkoxylated $C_8 - C_{22}$ carboxylic acid each
- 25 containing from 1-3 ethoxy groups
- or wherein the glyceryl alkyl or alkenyl ester (iii) is a monoester of a $C_8 - C_{22}$ carboxylic acid with glycerol.

3. A composition according to claim 2 wherein the co-surfactant is pentanol, hexanol, octanol, octan-2-ol, decanol and their branched chain or mixture of branched chain equivalents, oleyl alcohol, 2-ethyl-1-hexanol, an ethoxylated lauryl alcohol having a mean ethylene oxide content of 2, an ethoxylated octyl phenol having a mean degree of ethoxylation of 3 or glyceryl monolaurate.
4. A composition according to any of the preceding claims wherein the agrochemical electrolyte is selected from salts of glyphosate, fomesafen, glufosinate, paraquat and bentazone or is ammonium sulphate
5. A composition according to any of the preceding claims wherein the water-insoluble agrochemical system contains an agrochemical active ingredient.
6. A composition according to claim 5 wherein the water-insoluble system is a water-insoluble herbicide as herein defined.
7. A composition according to claim 6 wherein the water-insoluble herbicide is diuron, linuron, sulfometuron, chlorsulphuron, metsulfuron, chlorimuron, atrazine or simazine.
8. A concentrate according to any of the preceding claims wherein the composition additionally contains an ionic surfactant which is a cationic, anionic or amphoteric surfactant.
9. A concentrate according to claim 8 wherein the composition additionally contains a cationic surfactant having at least one linear or branched long chain alkyl or alkenyl or alkyl aryl substituent containing from 8 to 20 alkyl or alkenyl carbon atoms and a mean ethylene oxide content of from 0 to 20 which is an optionally ethoxylated amine, quaternary ammonium salt or amine oxide or wherein the composition additionally contains an anionic surfactant having at least one long chain alkyl or alkenyl substituent containing from 8 to 20 carbon atoms which is an alkyl sulphate, alkyl carboxylate, alkyl sulphosuccinate, alkyl phosphate or alkylbenzene sulphonate and derivatives thereof.
10. A concentrate according to any of the preceding claims wherein the water-insoluble agrochemical system is present in a proportion of from 150 parts by weight of agrochemical electrolyte to 1 part by weight of water-insoluble agrochemical system to 1 part by weight of agrochemical electrolyte to 4 parts by weight of water-insoluble agrochemical system.

11. A concentrate according to any of the preceding claims wherein the proportion of the co-surfactant is from 0.1 parts by weight to 1 part by weight per 1 part by weight of alkylglycoside.
- 5 12. A concentrate according to claim 8 wherein the proportion of additional ionic surfactant is from 0 parts by weight to 1 parts by weight ionic surfactant per 1 part alkylglycoside.
13. A concentrate according to any of the preceding claims wherein the proportion by weight of the total of the alkylglycoside, the cosurfactant and additional ionic
10 surfactant, if used, to the agrochemical electrolyte is from 4:1 to 1:10.
14. A process for severely damaging or killing unwanted plants which comprises applying to the plants a herbicidally effective amount of a composition according to any of the preceding claims wherein the agrochemical electrolyte is a herbicide.
15. A process for the preparation of a composition according to any of claims 1 to 14
15 which comprises bringing into admixture an aqueous dispersion of
- a) an agrochemical electrolyte
 - b) a water-insoluble agrochemical system and
 - c) an alkylglycoside and optionally
 - (e) an ionic surfactant
- 20 and thereafter adding
- d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system
- wherein the co-surfactant (d) is
- i) a linear or branched chain aliphatic or aromatic alcohol or
 - 25 ii) an alcohol or ester or alkyl phenol alkoxylate which is an alkoxylated $C_8 - C_{22}$ alcohol, an alkoxylated $C_8 - C_{22}$ alkyl phenol or an alkoxylated $C_8 - C_{22}$ carboxylic acid each containing from 1-3 alkoxy groups
- or
- iii) a glyceryl alkyl or alkenyl ester.
- 30

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| (54) Title: AGROCHEMICAL FORMULATION (57) Abstract A storage-stable aqueous agrochemical concentrate formulation comprises a) an agrochemical electrolyte such as glyphosate b) a water-insoluble agrochemical system such as diuron c) an alkylglycoside and d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system. Examples of the co-surfactant include: i) a linear or branched chain aliphatic or aromatic alcohol or ii) an alcohol alkoxylate or ester alkoxylate or alkyl phenol alkoxylate iii) a glyceryl alkyl or alkenyl ester and iv) a sorbitan alkyl or alkenyl ester. The composition optionally contains an additional ionic surfactant. <div data-bbox="852 1428 1282 1816" style="text-align: right;"></div> | | |

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AGROCHEMICAL FORMULATION

The present invention relates to agrochemical formulations and in particular to aqueous formulations containing an agrochemical electrolyte and a suspended system.

5 It may often be desirable to combine different agrochemicals to provide a single formulation taking advantage of the additive properties of each separate agrochemical and optionally an adjuvant or combination of adjuvants that provide optimum biological performance. In commercial practice it is often desired to minimise transportation and storage costs by using a formulation in which the concentration of the active agrochemical(s)
10 in the formulation is as high as is practicable and in which any desired adjuvants are "built-in" to the formulation as opposed to being separately tank-mixed. The higher the concentration of the active agrochemical(s) and its associated adjuvants however, the greater is the probability that the stability of the formulation may be disturbed and one or more component separates out. In general, the separation of a component from an agrochemical is
15 highly undesirable, particularly when the formulation is sold in bulk containers. In these circumstances it is virtually impossible to re-homogenise the formulation and to achieve even distribution of the components on dilution and spraying. Furthermore, the formulation must be stable in respect of storage for prolonged periods in both hot and cold climates. These factors all present formidable problems to the formulator. The problems may be exacerbated
20 still further if the formulation contains a water-soluble agrochemical electrolyte and a second agrochemical system which is water-insoluble. We have found that conventional anti-settling systems used to suspend water-insoluble agrochemicals, for example water-swelling clay suspending systems, may be rendered ineffective in the presence of a second agrochemical which is an electrolyte. Thus for example if a salt of glyphosate (a water-
25 soluble agrochemical electrolyte) is added to an aqueous system in which a dispersion of the water-insoluble herbicide diuron is stabilised by a water-swelling clay, the dispersion may well be de-stabilised such that the diuron settles out of the formulation.

We have now found that it is possible to provide a stable agrochemical aqueous concentrate containing (i) a water-soluble agrochemical electrolyte (ii) a water-insoluble
30 agrochemical system and (iii) a structuring system in which the compatibility problems of conventional suspending systems are overcome and that also offers formulation processing advantages.

Thus according to the present invention there is provided an aqueous agrochemical concentrate formulation comprising

- a) an agrochemical electrolyte
- b) a water-insoluble agrochemical system
- 5 c) an alkylglycoside
- d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system.

Whilst the scope of the present invention is not limited by any one particular theory as to the function of the components of the formulation, it is believed that the components, (and in particular the alkyl glycoside and the co-surfactant) interact to provide a structured aqueous system which acts to suspend the water-insoluble aqueous system. It is a particular advantage of the formulation of the present invention that the alkylglycoside not only provides one component of the suspending system but also acts as an adjuvant enhancing the biological activity of the agrochemical active ingredient. This is a significant advantage not only as a cost saving, but also because each additional component which has to be "built-in" to the formulation increases the stability problems. Thus having one single component, the alkylglycoside, which provides the radically different functions of a suspending agent and a biological activity enhancing adjuvant is a major and unexpected advance.

As examples of the co-surfactant which interacts with the alkylglycoside to form a structured aqueous system there may be mentioned compounds having a hydrophobic group in combination with a relatively small hydrophilic group for example:

- i) a linear or branched chain aliphatic or aromatic alcohol or
- ii) an alcohol alkoxylate or ester alkoxylate or alkyl phenol alkoxylate or
- iii) a glyceryl alkyl or alkenyl ester or
- 25 (iv) a sorbitan alkyl or alkenyl ester.

As used herein, the term alkyl, includes a linear or branched chain alkyl group and the term alkyl alcohol includes a linear or branched primary, secondary or tertiary alcohol. A linear or branched primary or secondary alkyl alcohol is generally preferred. As used herein, the term alkenyl, includes a linear or branched alkenyl group and the term alkenyl alcohol includes a linear or branched primary, secondary or tertiary alcohol. A linear or branched primary or secondary alkenyl alcohol is generally preferred.

The linear or branched chain alcohol (i) is preferably a primary or secondary, linear or branched alkyl or alkenyl alcohol containing from 5 to 20 carbon atoms or is a an alkyl-or alkenyl- substituted aromatic alcohol containing from 5 to 20 alkyl linear or branched carbon atoms, for example an alkylphenol containing from 5 to 20 alkyl carbon atoms. More
5 preferably the alcohol is an alkyl alcohol containing from 5 to 12 carbon atoms or an alkenyl alcohol containing about 18 carbon atoms. As specific examples of suitable alcohols there may be mentioned pentanol, hexanol, octanol, octan-2-ol, decanol and their branched chain or mixture of branched chain equivalents and oleyl alcohol. As a specific example of a branched chain alcohol there may be mentioned 2-ethyl-1-hexanol. Although it is believed
10 that the structuring of the aqueous phase is more than a mere viscosity effect, we have found that the viscosity of the formulation depends on the choice of alcohol. In general an excessively viscous formulation is less commercially desirable since it can be more difficult to handle a viscous formulation. We have found in particular that a branched alcohol such as 2-ethylhexanol gives effective dispersion through structuring of the aqueous phase whilst
15 providing a relatively low-viscosity formulation even at low ambient temperatures. Octanol is a readily available and effective co-surfactant.

The alcohol, ester or alkyl phenol alkoxylate (co-surfactant (ii)) preferably has an alkoxide content of from 1 to 5, and more preferably from 1 to 3 C₂ - C₄ alkoxy groups. The co-surfactant (ii) is preferably an alkoxylated C₈ - C₂₂ alcohol, an alkoxylated C₈ - C₂₂ alkyl
20 phenol or an alkoxylated C₈ - C₂₂ carboxylic acid each containing from 1-3 ethoxy groups. A suitable example is SYNPERONIC L2 which is based on lauryl alcohol with a mean ethylene oxide content of 2. A suitable example of the alkyl phenol alkoxylate is SYNPERONIC OP3 which is an ethoxylated octyl phenol with a mean degree of ethoxylation of 3.

25 As used herein (both generally and with specific reference to the alcohol or ester or alkyl phenol alkoxylate (ii)), the term "alkoxylated" includes both those compounds in which the alkoxy chain terminates in a hydroxyl group and those in which the alkoxy chain terminates in an alkyl group, such as a methyl group. Preferred alkoxy groups are ethoxy or propoxy, and a mixture of alkoxy groups, for example a mixture of ethoxy and propoxy
30 groups, may be present in the same alkoxylated molecule if desired.

The glyceryl alkyl or alkenyl ester (co-surfactant (iii)) is preferably a monoester of a C₈ - C₂₂ carboxylic acid with glycerol. A suitable example is CITHROL GML which is glyceryl monolaurate.

The sorbitan alkyl or alkenyl ester preferably contains from 8 to 22 carbon atoms in the ester group, an especially suitable sorbitan ester is a sorbitan monolaurate such as that available under the trade name SPAN 20.

The water-soluble agrochemical electrolyte may be an active agrochemical or an agrochemical enhancer such as ammonium sulphate or any other ionic species added to an agrochemical formulation. The term "agrochemical" includes compounds which possess biological activity, for example herbicides, fungicides, nematocides, insecticides (optionally with an insecticide synergist) and plant growth regulators. Suitable agrochemical actives which are agrochemical electrolytes are glyphosate (N-phosphonomethylglycine), which is commonly used in the form of its water-soluble salts such as trimethylsulphonium, isopropylamine, sodium, or ammonium salts, fomesafen which is commonly used in the form of its water-soluble sodium salt, glufosinate which is commonly used in the form of its water-soluble ammonium salt, paraquat dichloride and bentazone which is commonly used in the form of its water-soluble sodium salt. The use of an agrochemical enhancer or other additive which is itself an electrolyte may still further enhance the ionic strength of the composition, thereby increasing the potential stability problems. Thus for example glyphosate salts are commonly formulated or tank-mixed with ammonium sulphate as an activity enhancer, whilst magnesium sulphate may be added to paraquat as a purgative as disclosed for example in EP 0467529.

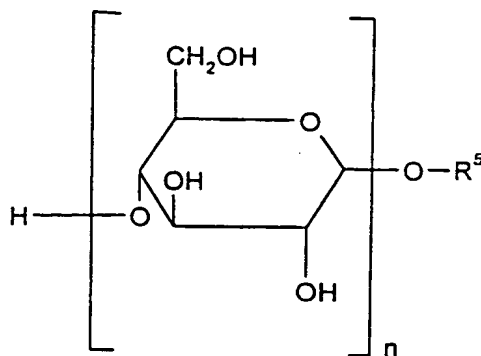
The water-insoluble agrochemical system is preferably a water-insoluble agrochemical active ingredient or a water-insoluble system containing an agrochemical active ingredient. The term "water-insoluble" includes a component which is partially soluble in the aqueous concentrate such that at least a proportion thereof is present as an undissolved solid component. The term "water-insoluble system" includes any system which is required to be suspended in the aqueous formulation and which contains an agrochemical active ingredient regardless of whether that active ingredient is itself soluble or insoluble. Thus an example of a water-insoluble system is a microencapsulated formulation of a water-soluble or -insoluble agrochemical active ingredient. If the water-soluble agrochemical electrolyte is a herbicide such as glyphosate or paraquat, the agrochemical active present in the water-insoluble system

will typically also be a herbicide, for example a water-insoluble herbicide. Typical water-insoluble herbicides include diuron, linuron, sulfometuron, chlorsulphuron, metsulfuron, chlorimuron, atrazine, simazine, quizalofop, butoxydim, nicosulfuron, rimsulfuron, bensulfuron, ametryn, pendimethalin, isoproturon, chlortoluron, diflufenican, mesotrione, acetonifent, flurochloridone, oxyfluorfen, isoxaflutole, imazamox and thifensulfuron although the present invention does not depend critically on the nature of the water-insoluble agrochemical or herbicide and many others are published in the literature.

If a water-insoluble agrochemical (such as a herbicide) is used to prepare the aqueous concentrate of the present invention, it is conveniently incorporated in the form of a millbase (a finely divided suspension prepared by milling the solid agrochemical in water). The millbase will typically contain a minor proportion, for example from about 2% to about 10% by weight based on the weight of solid agrochemical, of a dispersing agent to assist dispersion. The dispersing agent used in the millbase may be a cationic, anionic, amphoteric or non-ionic surfactant or polymer. However, as noted below, there are advantages in including a cationic surfactant in the formulation of the present invention and it may be convenient therefore to use a cationic surfactant as dispersing agent in the millbase.

The alkylglycoside for use in the present invention may be obtained by the reaction of alkanols with glucose or other mono- or di- or polysaccharides. As used herein the term "alkylglycoside" includes an alkylmonoglycoside and an alkylpolyglycoside. Preferred alkylglycosides for use in the present invention are alkylglucosides obtained by the reaction of glucose with a straight or branched chain alkanol or mixture of alkanols, for example a mixture of alkanols containing 7 to 18, preferably 7 to 16 carbon atoms for example 8 to 10 carbon atoms. The number of glucose groups per alkyl group in the molecule may vary and alkyl mono- or di- or polyglucose or saccharide derivatives are possible. Commercial alkylpolyglucosides usually contain a mixture of derivatives having an average number of

glycose groups per alkyl group. Thus alkylglycosides have the general formula (I)



(I)

wherein n is the degree of polymerisation and is typically within the range from 1 to 3, for example from 1 to 2, and R^5 is a branched or straight chain alkyl group having from 4 to 18 carbon atoms or a mixture of alkyl groups having an average value within the given range. Typical of alkylglycosides is the product commercially available under the trade names AL2042 (Imperial Chemical Industries PLC and AGRIMUL PG2067 (Henkel Corp) wherein n is an average of 1.7 and R^5 is a mixture of octyl (45%) and decyl (55%), the product commercially available under the trade name AGRIMUL PG2069 (Henkel Corp) wherein n is an average of 1.6 and R^5 is a mixture of nonyl (20%), decyl (40%) and undecyl (40%) and the product commercially available under the trade name BEROL AG6202 (Akzo Nobel) which is 2-ethyl-1-hexylglycoside.

As indicated previously, the agrochemical formulations of the present invention are preferably stable at relatively high ambient temperatures. It has been found that enhanced high temperature stability may be obtained by the inclusion of a minor proportion of an ionic surfactant (component e) and it is believed that the presence of a minor proportion of an ionic surfactant in the formulation increases the amount of structuring that occurs, particularly at high temperatures. The addition of an ionic surfactant therefore offers another advantage, in that lower concentrations of the alkylglycoside and co-surfactant (d) can be used to produce stable formulations.

A wide range of suitable ionic surfactants (component e) will occur to those skilled in the art and those which have been found to enhance stability include cationic, anionic and amphoteric surfactants. Particularly suitable are cationic surfactants which include optionally ethoxylated amines, quaternary ammonium salts and amine oxides having at least one (for example 1, 2, 3 or 4) long chain (linear or branched) alkyl or alkenyl or alkyl aryl

substituent(s) containing from 8 to 20 carbon atoms in the alkyl or alkenyl group and a preferred mean ethylene oxide content of from 0 to 20, even more preferably from 0 to 5. Particularly suitable anionic surfactants include alkyl sulphates, alkyl carboxylates, alkyl sulphasuccinates, alkyl phosphates and alkylbenzene sulphonates and their derivatives
5 having at least one long chain alkyl or alkenyl substituent containing from 8 to 20 carbon atoms. In some instances the additional ionic surfactant may even provide an increase in the activity of the composition.

Especially preferred additional surfactants (component e) are cationic surfactants such as ethoxylated amines and optionally ethoxylated quaternary ammonium salts.

10 Examples of suitable additional cationic surfactants include hexadecyl trimethyl ammonium chloride, coco trimethyl ammonium chloride and N-methyl cocoammonium chloride having a mean ethylene oxide content of 2.

As noted above, the advantages of the formulation of the present invention are fully realised at high concentrations of the agrochemical electrolyte such that, in the absence of the
15 co-surfactant which interacts with the alkylglycoside to form a structured aqueous system (component d), one or more component is not satisfactorily suspended, thereby destroying the homogeneity of the concentration of the components within the formulation.

The agrochemical electrolyte glyphosate is especially suitable for formulation according to the present invention. Thus for example the present invention provides
20 formulations of glyphosate wherein the concentration of glyphosate salt (expressed as glyphosate acid) is greater than 120 g/l and more particularly greater than 240 g/l, and most particularly greater than 300g/l for example about 330 g/l or more.

The present invention provides excellent flexibility in the incorporation of the water-insoluble agrochemical system and it will generally be possible to include a wide range of
25 proportions depending on the combined agrochemical effect it is desired to obtain. Thus the proportions may typically be from 150 parts by weight of agrochemical electrolyte to 1 part by weight of water-insoluble agrochemical system through to 1 part by weight of agrochemical electrolyte to 4 parts by weight of water-insoluble agrochemical system. The upper limit of the content of the water-insoluble agrochemical system is determined only by
30 the proportion that can be effectively suspended and we have found for example that up to 500 g/l or more of a water-insoluble herbicide may generally be suspended in formulations of the present invention.

The co-surfactant (component d) present in the formulation is preferably from 0.1 parts by weight to 1 part by weight per 1 part by weight of alkylglycoside and most preferably from 0.2 parts by weight to 0.8 parts by weight of co-surfactant per 1 part by weight of alkylglycoside.

5 The proportion of additional ionic surfactant (component e) is preferably from 0 to 1 part by weight per 1 part by weight alkylglycoside and most preferably from 0.1 parts by weight to 0.3 parts by weight ionic surfactant per 1 part alkylglycoside. As noted above, a proportion of the additional ionic surfactant may initially be present as a dispersing agent in a millbase of a water-insoluble agrochemical.

10 In general, it is preferred that the total proportion of alkoxyated surfactant present (either as component (e) or as a dispersing agent for the water-insoluble agrochemical) will be below the concentration which would undergo phase separation in the absence of the structuring provided by the co-surfactant (d).

The proportion by weight of the total adjuvant or structuring system (i.e. components (c) (d) and (e) if used) to the agrochemical electrolyte is preferably from 4:1 to 1:10 and especially from 1:1 to 1:4.

15 Other additives, humectants or additional adjuvants may also be present in compositions of the present invention. Examples include anti-freeze agents such as ethylene glycol, urea and propylene glycol; dyes; polymers; dispersants; rheological agents; and anti-foam agents such as silicone based agents. If any such additional component, whether a liquid or an insoluble solid, itself has a tendency to phase separate or settle from the composition, the structured phase provided by the present invention will additionally serve to keep such additional component homogeneously distributed throughout the formulation.

20 Compositions of the present invention provide adjuvant enhancement for the active agrochemicals concerned or increase the effectiveness of the adjuvant if the agrochemical electrolyte is an agrochemical enhancer such as ammonium sulphate. Thus formulations of the invention wherein the agrochemical electrolyte is a herbicide, and in particular when the herbicide is glyphosate, are active against a broad range of weed species including monocotyledonous and dicotyledonous species.

30 Thus according to a further aspect of the present invention wherein the agrochemical electrolyte is a herbicide, there is provided a process of severely damaging or killing

unwanted plants which comprises applying to the plants a herbicidally effective amount of a composition of the present invention.

The rate of application of the composition of the invention will depend on a number of factors including, for example, the active ingredients chosen for use, the identity of the plants whose growth is to be inhibited and the formulations selected for use and whether the compound is to be applied for foliage or root uptake. As a general guide, however, an application rate of from 0.001 to 20 kilograms per hectare is suitable while from 0.025 to 10 kilograms per hectare may be preferred.

We have found that the development of a structured aqueous phase and a homogeneous dispersion which gives a uniform distribution in respect of all the components within the formulation, is not critically dependent on the method of preparation of the formulation. It is preferred however that structuring of the system does not take place (i.e. the alkylglycoside and co-surfactant (d) are not brought together) until all the other components, and in particular the water-insoluble system, are effectively dispersed. Whilst it would be possible to add the alkylglycoside to all the other components, including the co-surfactant (d), it is normally simpler to admix all the components apart from the co-surfactant (d) which is only added once an effective dispersion has been obtained. It will be appreciated that before structuring takes place the formulation is relatively free-flowing so that for example the millbase of an insoluble herbicide is readily dispersed. Once structuring takes place, the dispersion is held in stable suspension.

Thus according to a further aspect of the present invention there is provided a method for forming an aqueous agrochemical concentrate formulation which comprises bringing into admixture an aqueous dispersion of

- a) an agrochemical electrolyte
- b) a water-insoluble agrochemical system and
- c) an alkylglycoside and optionally
- (e) an ionic surfactant

and thereafter adding

- d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system.

It is a particular advantage of the method of the present invention that the structuring of the system can be accomplished using a low shear mixer to incorporate the co-surfactant.

Thus effective dispersion can typically be achieved using a simple paddle stirrer. In contrast, prior art systems that use a water-swellaible clay and/or polysaccharide gels, require high-shear mixing to disperse either the millbase into a pre-structured system or the clays / polysaccharides (unswollen or pre-swelled) into the millbase. Factors such as this add considerably to the cost of preparing a formulation on a commercial scale. Furthermore, we have found that preferred ionic surfactants such as ARQUAD 16-29 which would otherwise improve the performance of the electrolyte formulation may themselves be incompatible with water-swellaible clays resulting in an unstable formulation.

The order of addition of components (a), (b) and (c) (and (e) if used) is not important provided that structuring of the system takes place once effective dispersion has been achieved.

In general, we have not encountered significant problems in diluting the formulation of the present invention ready for agrochemical use, although excessively viscous or excessively structured compositions may require care to ensure that the concentrate has been effectively dispersed in the water of dilution before use.

The invention is illustrated by the following Examples in which all parts and percentages are by weight unless otherwise stated. The description of commercially available surfactants is given below.

AGRIMUL PG 2067 is a 70 %w/w solution of alkylpolyglycoside of formula (I) above wherein n is an average of 1.7 and R^5 is a mixture of octyl (45%) and decyl (55%).

AGRIMUL is a trademark of Henkel.

ARQUAD 16-29 is a 29% by weight solution of hexadecyl trimethyl ammonium chloride in water. ARQUAD is a trademark of Akzo Nobel.

TETRONIC 1307 is an ethoxylated / propoxylated diamine with 70% ethylene oxide and a molecular weight of 18,000. Tetronic is a trademark of BASF.

BENTOPHARM B20 is a bentonite clay. Bentopharm is a trademark of Bromhead and Dennison

KELZAN M is a xanthum gum. Kelzan is a trademark of Monsanto.

SYNPERONIC L2 is an ethoxylated lauryl alcohol having a mean degree of ethoxylation of 2. SYNPERONIC is a trademark of Imperial Chemical Industries.

EXAMPLE 1

A composition according to the present invention was prepared as follows:-

To an aqueous solution of paraquat dichloride was added AGRIMUL PG 2067 and makeup water with mixing. Once a homogenous solution was obtained, diuron millbase containing ARQUAD 16-29 as dispersant was added with mixing. A homogeneous dispersion was readily obtained and thereafter octanol was added with mixing to provide a structured system.

The proportions of the components in the final composition were as follows:-

| | |
|---|------------|
| Example 1 | |
| Paraquat dichloride (expressed as paraquat ion) | 150 g/l |
| Diuron | 150 g/l |
| ARQUAD 16-29 (expressed as the active surfactant) | 15 g/l |
| AGRIMUL PG2067 (expressed as the active surfactant) | 105 g/l |
| Octanol | 30 g/l |
| Water | to 1 litre |

The resultant structured composition was tested for physical stability at -5, 25 & 40°C respectively and remained stable under all these conditions when observations were discontinued after 15 weeks.

EXAMPLE 2

The procedure of Example 1 was followed to give the following composition:

| | |
|--|------------|
| Example 2 | |
| Glyphosate trimesium (expressed as glyphosate acid) | 200 g/l |
| Diuron | 200 g/l |
| ARQUAD 16-29 added in the diuron millbase (expressed as the active surfactant) | 20 g/l |
| AGRIMUL PG2067 (expressed as the active surfactant) | 98 g/l |
| Octanol | 28 g/l |
| Water | to 1 litre |

The resultant structured composition was tested for physical stability at -5, 25 & 40°C respectively and remained stable under all these conditions when observations were discontinued after 14 weeks.

COMPARISON 1

- 5 This comparison illustrates that conventional diuron dispersions may be structured using a KELZAN/BENTOPHARM suspending system but can lose stability in the presence of an agrochemical electrolyte. The diuron millbase contained TETRONIC 1307 as a dispersant which is compatible with the KELZAN/BENTOPHARM suspending system. . It was found that a high-shear stirrer was necessary to provide an effective dispersion of the
- 10 KELZAN/BENTOPHARM suspending system.

| | |
|---|------------|
| Comparison 1A | |
| Diuron | 150 g/l |
| TETRONIC 1307 added in the diuron millbase (expressed as the active surfactant) | 15 g/l |
| BENTOPHARM B20 (10% in water - expressed as Bentonite clay) | 15g/l |
| KELZAN M (2% in water - expressed as xanthum gum) | 2 g/l |
| Water | to 1 litre |

The resultant composition was tested for physical stability at -5, 25 & 40°C respectively. The composition froze at -5°C but remained stable at 25 and 40°C when observations were discontinued after 5 weeks.

| | |
|---|------------|
| Comparison 1B | |
| Paraquat dichloride (expressed as paraquat ion) | 150 g/l |
| Diuron | 150 g/l |
| TETRONIC 1307 added in the diuron millbase (expressed as the active surfactant) | 15 g/l |
| BENTOPHARM B20 (10% in water - expressed as bentonite clay)) | 15g/l |
| KELZAN M (2% in water - expressed as xanthum gum) | 2 g/l |
| Water | to 1 litre |

- 5 The resultant composition was tested for physical stability at -5, 25 & 40°C respectively. Compositions were found to be unstable at all temperatures after 4 days.

COMPARISON 2

- 10 This comparison illustrates that a composition equivalent to that of Example 2 but using a KELZAN/BENTOPHARM suspending system in place of that of the present invention is unstable after only 1 week. Furthermore, even in the absence of the electrolyte glyphosate trimesium, the composition is unstable, it is believed as a result of an adverse interaction of the preferred ARQUAD 16-29 dispersant and the KELZAN/BENTOPHARM suspending system.

| Comparison 2A | | Comparison 2B | |
|---|---------|---|---------|
| Glyphosate trimesium (expressed as glyphosate acid) | 200 g/l | | |
| Diuron | 200 g/l | Diuron | 200 g/l |
| ARQUAD 16-29 (expressed as the active surfactant) | 20 g/l | ARQUAD 16-29 (expressed as the active surfactant) | 20 g/l |
| BENTOPHARM B20 (10% in water - expressed as bentonite clay) | 15 g/l | BENTOPHARM B20 (10% in water - expressed as bentonite clay) | 15 g/l |

| | | | |
|--|------------|--|---------------|
| KELZAN M (2% in water - expressed as xanthum gum) | 2 g/l | KELZAN M (2% in water - expressed as xanthum gum) | 2 g/l |
| Water | to 1 litre | Water | to 1 litre |

Comparisons 2A and 2B were found to be unstable after between 4 days and 1 week at 25 and 40°C.

EXAMPLE 3

- 5 This Example illustrates the beneficial effect of adding a quaternary ammonium salt (hexadecyl trimethyl ammonium chloride) as an additional ionic surfactant (component (e)). Formulations were prepared using the general method of Example 1 according to the following composition:-

| | |
|--|------------|
| Example 3 | |
| Glyphosate trimesium (expressed as glyphosate acid) | 350 g/l |
| Diuron | 100 g/l |
| ARQUAD 16-29 added in the diuron millbase (expressed as the active surfactant) | 10 g/l |
| Additional ARQUAD 16-29 (expressed as the active surfactant) | X g/l |
| AGRIMUL PG2067 (expressed as the active surfactant) | 35 g/l |
| Octanol | 10 g/l |
| Water | to 1 litre |

- 10 Conditions were deliberately chosen to be testing with a high concentration of glyphosate trimesium and a concentration of alkylglycoside well below that considered as optimum. The quantity of ARQUAD 16-29 added in the diuron millbase was equivalent to 10 g/l. Under these exceptional conditions, the composition failed the stability test when no additional ARQUAD 16-29 was added (X in the above Table is 0). However as additional
- 15 quantities of ARQUAD 16-29 were added (20, 30 and 40 g/l respectively) the stability of the composition progressively improved. This improvement is illustrated in the following Table which shows the stability of the composition as a function of the added ARQUAD 16-29

(X g/l in the above Table). Stability was measured after 3.5 weeks at -5, 25 and 40°C respectively.

| X (g/l) | Temperature | | |
|---------|------------------------------|-------------------------|-------------------------|
| | -5 °C | 25 °C | 40 °C |
| 0 | Top separation only | Catastrophic separation | Catastrophic separation |
| 20 | Partial separation | Trace of top separation | Trace of top separation |
| 30 | Top separation and streaking | Top separation only | Homogeneous |
| 40 | Homogeneous | Homogeneous | Homogeneous |

5

EXAMPLE 4

This Example illustrates the use of SYNPERONIC L2 as co-surfactant (component d). The following composition was prepared using the general method of Example 1:-

| | |
|--|------------|
| Example 4 | |
| Glyphosate trimesium (expressed as glyphosate acid) | 200 g/l |
| Diuron | 200 g/l |
| ARQUAD 16-29 added in the diuron millbase (expressed as the active surfactant) | 20 g/l |
| AGRIMUL PG2067 (expressed as the active surfactant) | 63 g/l |
| SYNPERONIC L2 | 45 g/l |
| Water | to 1 litre |

10 The resultant structured composition was tested for physical stability at -5, 25 & 40°C respectively and remained stable under all these conditions when observations were discontinued after 4 weeks.

CLAIMS

1. An aqueous agrochemical concentrate formulation comprising
 - a) an agrochemical electrolyte
 - b) a water-insoluble agrochemical system
 - 5 c) an alkylglycoside
 - d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system.
2. A concentrate according to claim 1 or claim 2 wherein the co-surfactant (d) is
 - i) a linear or branched chain aliphatic or aromatic alcohol or
 - 10 ii) an alcohol alkoxylate or ester alkoxylate or alkyl phenol alkoxylate
 - iii) a glyceryl alkyl or alkenyl ester or
 - (iv) a sorbitan alkyl or alkenyl ester.
3. A concentrate according to claim 2 wherein the linear or branched chain alcohol (i) is a primary or secondary, linear or branched alkyl or alkenyl alcohol containing from 5
15 to 20 carbon atoms or is a an alkyl- or alkenyl-substituted aromatic alcohol containing from 5 to 20 linear or branched alkyl carbon atoms or wherein
the alcohol or ester or alkyl phenol alkoxylate (ii) is an alkoxylated C₈ - C₂₂ primary or secondary, linear or branched chain alcohol, an alkoxylated C₈ - C₂₂ alkyl phenol
20 or an alkoxylated C₈ - C₂₂ carboxylic acid each containing from 1-3 C₂ - C₄ alkoxy groups
or wherein
the glyceryl alkyl or alkenyl ester (iii) is a monoester of a C₈ - C₂₂ carboxylic acid with glycerol
25 or wherein
the sorbitan alkyl or alkenyl ester (iv) is a sorbitan ester having from 8 to 22 carbon atoms in the ester group.
4. A composition according to claim 3 wherein the co-surfactant is pentanol, hexanol, octanol, octan-2-ol, decanol and their branched chain or mixture of branched chain
30 equivalents, oleyl alcohol, 2-ethyl-1-hexanol, an ethoxylated lauryl alcohol having a mean ethylene oxide content of 2, an ethoxylated octyl phenol having a mean degree of ethoxylation of 3, glyceryl monolaurate and sorbitan monolaurate.

5. A composition according to any of the preceding claims wherein the agrochemical electrolyte is selected from salts of glyphosate, fomesafen, glufosinate, paraquat and bentazone or is ammonium sulphate
6. A composition according to any of the preceding claims wherein the water-insoluble agrochemical system contains an agrochemical active ingredient.
7. A composition according to claim 6 wherein the water-insoluble system is a water-insoluble herbicide as herein defined.
8. A composition according to claim 7 wherein the water-insoluble herbicide is diuron, linuron, sulfometuron, chlorsulphuron, metsulfuron, chlorimuron, atrazine or simazine.
9. A concentrate according to any of the preceding claims wherein the composition additionally contains an ionic surfactant which is a cationic, anionic or amphoteric surfactant.
10. A concentrate according to claim 9 wherein the composition additionally contains a cationic surfactant having at least one linear or branched long chain alkyl or alkenyl or alkyl aryl substituent containing from 8 to 20 alkyl or alkenyl carbon atoms and a mean ethylene oxide content of from 0 to 20 which is an optionally ethoxylated amine, quaternary ammonium salt or amine oxide or wherein the composition additionally contains an anionic surfactant having at least one long chain alkyl or alkenyl substituent containing from 8 to 20 carbon atoms which is an alkyl sulphate, alkyl carboxylate, alkyl sulposuccinate, alkyl phosphate or alkylbenzene sulphonate and derivatives thereof.
11. A concentrate according to any of the preceding claims wherein the water-insoluble agrochemical system is present in a proportion of from 150 parts by weight of agrochemical electrolyte to 1 part by weight of water-insoluble agrochemical system to 1 part by weight of agrochemical electrolyte to 4 parts by weight of water-insoluble agrochemical system.
12. A concentrate according to any of the preceding claims wherein the proportion of the co-surfactant is from 0.1 parts by weight to 1 part by weight per 1 part by weight of alkylglycoside.

13. A concentrate according to claim 9 wherein the proportion of additional ionic surfactant is from 0 parts by weight to 1 parts by weight ionic surfactant per 1 part alkylglycoside.
14. A concentrate according to any of the preceding claims wherein the proportion by weight of the total of the alkylglycoside, the cosurfactant and additional ionic surfactant, if used, to the agrochemical electrolyte is from 4:1 to 1:10.
15. A process for severely damaging or killing unwanted plants which comprises applying to the plants a herbicidally effective amount of a composition according to any of the preceding claims wherein the agrochemical electrolyte is a herbicide.
16. A process for the preparation of a composition according to any of claims 1 to 14 which comprises bringing into admixture an aqueous dispersion of
- a) an agrochemical electrolyte
 - b) a water-insoluble agrochemical system and
 - c) an alkylglycoside and optionally
 - (e) an ionic surfactant
- and thereafter adding
- d) a co-surfactant which interacts with the alkylglycoside to form a structured aqueous system.

INTERNATIONAL SEARCH REPORT

Inter. / Application No

PCT/GB 00/00249

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A01N57/20 A01N43/40 A01N25/30 A01N25/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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PCT/GB 00/00249

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